

A/N 16774

WCMC Reports 99

# **Assessment of information required for the implementation of the Pan-European Ecological Network**

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**WORLD CONSERVATION  
MONITORING CENTRE**

Version 6  
31 January 1999

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# 1 EXECUTIVE SUMMARY

The collection and use of information is an essential step in the definition, implementation and review of the Pan-European Ecological Network. This report is an assessment of the information required, and provides a series of **recommendations** for international action, **suggestions** for national action, and **considerations** in managing information.

At the national level, many of the **suggestions** made are already being implemented, and many of the **considerations** are already understood. It is hoped that this paper will help support the work already underway, and build on it constructively. At the international level, much remains to be done to provide the tools that national system managers require to ensure Pan-European priorities are being met. The following ten **recommendations** seem particularly important and urgent in this regard.

## Recommendation for International Action 1

Draft a review of information on Pan-European species and ecosystems that provides the following information, based as far as possible of existing information sources.

- ☒ Comparative analysis of the annexes, appendices and criteria of existing international agreements
- ☒ List of species and ecosystems threatened at global and/or Pan-European levels
- ☒ List of species and ecosystems endemic to Pan-European region
- ☒ List of species and ecosystems characteristic of the Pan-European region
- ☒ List of species with a "special role" within the Pan-European region
- ☒ Comparative list of species and ecosystems to identify status on other lists
- ☒ Analysis of the above lists by country to identify national responsibilities

Make this information available with appropriate instruction for those who are:

- a) implementing ecological networks at the national level, so that they can incorporate Pan-European priorities into national conservation action; and
- b) making international assessment of the extent to which the Pan-European Ecological network has been implemented.
- c) reviewing the criteria, annexes and appendices of the international agreements

## Recommendation for International Action 4

In order to effectively implement Recommendation 1 and to more effectively implement international agreements at the Pan-European level, prepare a report reviewing distribution information by country for all species:

- ☒ listed on appendices or annexes to international agreements; and/or
- ☒ otherwise identified as being of importance at the Pan-European level.

## Recommendation for International Action 9

Continue the international efforts required to harmonize the information management and reporting requirements of international agreements and programmes, and foster efforts to increase the sharing of information between programmes and secretariats.

## Recommendation for International Action 12

Prepare a review of transboundary areas of Pan-European significance based on a review of the appendices, annexes and criteria of International agreements, and other criteria of Pan-European significance.

## Recommendation for International Action 13

Develop a compendium of information sources and key contacts to assist national ecological network managers, and guidelines on how this activity can be replicated at the national level.

#### **Recommendation for International Action 14**

Consider development of a metadatabase of information sources on biodiversity elements of Pan-European significance, building on the work of the Council of Europe and the European Environment Agency and its European Topic Centres on Nature Conservation and Catalogue of Data Sources.

#### **Recommendation for International Action 19**

An international assessment programme should be developed which compiles information from national and other sources in order to assess the effectiveness of the Pan-European Ecological Network in protecting species and ecosystems of Pan-European significance. The programme should be based on periodic submission of information from national assessment programmes, and supporting information from research institutes and international organizations. The programme should aim to achieve two interrelated tasks:

- a) Assessment of progress in achieving the objectives of the Pan-European Ecological Network as a means to report on activity, to set future priorities, and to orient future action.
- b) To provide data and information which will support other activities at the Pan-European level, including education, communication and research.
- c) reviewing the criteria, annexes and appendices of the international agreements.

#### **Recommendation for International Action 20**

Review all the research needs for establishment of the Pan-European Ecological Network implied by the *Criteria* and *Guidelines* papers and this assessment, and draw up a list of research priorities that might be addressed by European universities and research institutes.

#### **Recommendation for International Action 23**

Develop an international system for compiling and managing information on the sites which comprise the Pan-European Ecological Network, coupled with information on species and ecosystems of Pan-European significance and links with other "site-based" international conventions and programmes. Use this information system in supporting both reporting on the status of the network, and the ongoing establishment and review of needs and priorities, making it available in such a manner that it can be used by national system managers in reviewing Pan-European priorities (incorporating information from the lists compiled in response to Recommendation 1 and identifying the extent to which these priorities are already being addressed).

#### **Recommendation for International Action 26**

Develop a reporting format and process for the Pan-European Ecological Network which will:

- a) Ensure that Pan-European targets are being met, and future priorities based on progress to date.
- b) Provide national agencies with comparative information to support their future efforts in management and implementation.
- a) Support research programmes, particularly those oriented towards further implementation of the Pan-European Strategy.
- b) Compile information to support communications programmes and fund raising at the international level.

In developing the reporting format and process, the agencies concerned should ensure that:

- a) Information is only requested if it is actually required for a real identifiable purpose, which is understood by those doing the reporting.
- b) Information is not requested if it is already available elsewhere.
- c) The information requested is part of what the country would (or should) need to have access to anyway in developing and managing its designated area networks.

## 2 INTRODUCTION

### 2.1 The Pan-European Biological and Landscape Diversity Strategy

Action Theme 1 of the Action Plan 1996-2000 of the Pan-European Biological and Landscape Diversity Strategy advocates the development of a Pan-European Ecological Network. This proposed network constitutes an *operational framework* for bringing together and strengthening the whole set of existing site-based conservation initiatives at national and regional level.

The five-year Action Plan that was adopted with the Strategy identifies a series of priority actions for the establishment of the Pan-European Ecological Network within 10 years:

- ◆ establish a development programme for the Pan-European Ecological Network;
- ◆ develop the first phase of an implementation programme for the Pan-European Ecological Network;
- ◆ stimulate the development of national ecological networks and their linkage with the Pan-European Ecological Network; and
- ◆ promote awareness of the Pan-European Ecological Network.

### 2.2 Development of the Pan-European Ecological Network

The first actions in developing the programme have included the preparation of two reference documents for use by those involved in establishing and managing the Pan-European Ecological Network. The paper *Development of an approach to a Pan-European Ecological Network* sets out an approach to conserving biodiversity in Europe, and defines criteria to be used in identifying biological and landscape elements of Pan-European significance. The *Guidelines for the development of the Pan-European Ecological Network* provide guidance on what the network will be, the process through which it will be established, who will be involved and how, and the relation with other sectors and initiatives.

Both of these defining documents were presented, widely discussed and well accepted at the international conference to support the establishment of the Pan-European Ecological Network in Central and Eastern Europe *Green Backbone of Central and Eastern Europe* held in Krakow, Poland, 24-28 February 1998. They were subsequently discussed at a meeting of the Committee of Experts, and further revisions made. The *Guidelines* have now been forwarded via the Bureau to the Council of the Pan-European Biological and Landscape Diversity Strategy, while the *Criteria* paper has the status of a discussion paper for members of the Committee of Experts.

While these documents were being prepared, it was decided to compile a briefing document on those sites in Europe that were already internationally recognized in one way or another. It was felt that such a document would indicate to politicians and decision makers both the extent of the networks that already existed, and the opportunities for greater coordination that these networks implied. The report *Nature conservation sites designated in application of international instruments and their importance for the Pan-European Ecological Network* was produced, along with a poster-map illustrating the distribution of sites which are part of several of these international agreements and programmes.

### 2.3 Developing the information assessment

The current document is based on a review of the above-mentioned reports, and on the authors' understanding of information and information management needs. In addition, there was consultation

with representatives of national and international institutions at various points during the project, and particularly at the Krakow conference. The objective of the information assessment is to support achievement of the Pan-European Ecological Network by:

- ♦ helping to identifying what information is required in implementing the network, and where that information might be found;
- ♦ helping to identify what additional information compilation and research may be required for long-term implementation of the network;
- ♦ helping to identify the information and mechanisms required for regularly assessing the extent to which the network has been implemented; and
- ♦ helping to identify information management and processing needs..

Preparation of this information assessment, which is primarily oriented towards Central and Eastern Europe, was supported by the Dutch Ministry for Agriculture, Nature Management and Fisheries as part of a larger project on *Development of a common approach to the implementation of the Pan-European Ecological Network in Central and Eastern Europe*.

## 2.4 Intended users of the information assessment

The people that this strategy aims to support can be divided into two basic groups:

**Members of the Committee of Experts and those advising them** - The Committee of Experts has to guide development of the Pan-European Ecological Network and to assess implementation. Information is needed *inter alia* to support identification of Pan-European priorities, for overview of existing initiatives, for identification of synergies with other international initiatives, and to assessment of progress in implementing the network.

**National organizations responsible for implementing the network** - National organizations need to incorporate Pan-European priorities and objectives into implementation of their national ecological networks. Information is needed from both national and international sources to assess conservation priorities, and information is required to support both management and reporting processes.

The information assessment should be considered as guidance and advice for these user-groups rather than as a series of instructions. With this in mind, many of the recommendations are generic rather than specific, as the actual actions carried out will depend on national circumstances both in terms of information available and resources available.

This information assessment does **not** cover the wider use of information in communication and education programmes, and the general promotion of the Pan-European Ecological Network. This is being separately dealt with by the European Centre for Nature Conservation and the Council for Europe as part of a **Communication Strategy**.

## 2.5 Types of "recommendation"

Within this information assessment, three types of "recommendations have been identified for those involved in implementation of the Pan-European Ecological Network. These are:

**Recommendations for international action** – which are tasks we believe should be either carried out or at least coordinated at the regional level.

**Suggestions for national action** – which are tasks which we believe will need to be carried out at the national level in order to implement Pan-European priorities in national action. In many countries these activities are likely to be already under way.

**Considerations in managing information** – which are observations on good information management practice which all those involved in management and use of information would do well to consider.

## 2.6 Definitions

To ensure proper understanding of several key words and phrases used in the report, and to avoid misinterpretation, these are defined here.

**Biodiversity** - The variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems (from Article 2 of the *Convention on Biological Diversity*).

**Pan-European Ecological Network** - A comprehensive (and connective) network of areas aiming at the conservation of ecosystems and species with high nature conservation value and/or a favourable conservation status, and providing for the conservation needs of these ecosystems and species (from the paper *Development of an approach to a Pan-European Ecological Network*).

**Protected Area** - An area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means (definition adopted by the IUCN World Commission on Protected Areas).

**Information** - In the context of this strategy, we are defining information as quantitative or qualitative data, processed and integrated to a degree which ensures its effective use in further research and analysis or in supporting decision making in the field of nature conservation.

**Information assessment** - Guidance in using information effectively and efficiently in the development, management and review of the Pan-European Ecological Network. This definition deliberately excludes the use of information in communication and education programmes.

### 3 BACKGROUND

The *Guidelines* for the development of the Pan-European Ecological Network clearly recognise information is fundamentally important in the development of the network. It is essential to ensure that, as far as possible, sufficient and appropriate data, methodologies, evaluation techniques and other relevant information are available for use by the actors involved in developing and implementing the network.

#### 3.1 Biodiversity information

A fundamental problem in understanding biodiversity at any scale is the huge complexity of the subject matter. The living biota (all organisms existing in given area) interact permanently in multiplicity of ways, and any effort to achieve an accurate description of the status of wildlife in any given area necessarily involves incorporation of factors of time, space, the relationships between populations, species, communities, ecosystems, and so on. These and many other measurable or observable factors and elements have been developed as mechanisms for helping us to understanding the status of complex living systems and their components, but each of these are only indicators of status or change.

There is therefore a huge range of data that could be collected in an attempt to make our understanding complete, but a programme to collect this would be impractical. It is therefore necessary to:

- ◆ identify those measures that can provide an indication of the status of a wide range of biodiversity, so as to make the range of measures that need to be taken more achievable;
- ◆ identify those biodiversity components or areas of interest that can provide maximum "return" on investment in monitoring, so that programmes do not need to try to assess the status of all biodiversity components and all areas to the same extent;
- ◆ develop mechanisms for handling imprecise information in order to maximise its value; and
- ◆ build on existing monitoring and reporting mechanisms wherever possible.

#### 3.2 Information needs for national action

The overall success of conservation measures at any particular level and in any particular area depends basically on a combination of an adequate investment of resources, and an effective and efficient programme of measures undertaken. Both of these processes can be improved with the help of better information incorporated into the decision making processes. Indeed, in the situation where the resources addressed to the conservation are always limited, optimal distribution of those resources may provide even greater input into overall efficiency of conservation efforts, and this certainly requires an effective use of information in decision making.

##### 3.2.1 Identifying the action to be taken

Information is required in order to assess both the priorities and the practicalities for conservation action. In the context of the Pan-European Ecological Network information on international priorities needs to be combined with information on national status and distribution, and on the related potential for conservation action. Conservation action is essentially managed at the national or local level, but information is required from international sources as well as nationally. This requires *inter alia* compilation of information at the international level from national and local sources in each country.

### **3.2.2 Implementing action on the ground**

Information is required in planning conservation activities, in ensuring feedback mechanisms that allow adjustments to be made to improve or correct those activities, and in assessing the value and impact of activities. Conservation action in the field is carried out by national or local entities operating within a framework of national and local policies, but these can also be modified by or influenced by bilateral or multilateral cooperative projects, programmes or agreements. This could imply a need for a wide range of information.

### **3.2.3 Obtaining resources**

Information is required for justifying claims for resources, and for assessing achievement (or otherwise) with previous allocations. The total amount of funds allocated for conservation and for the development of the Pan-European Ecological Network might also be increased with more effective use of up-to-date information on the overall importance of the network and the value of the projects and programmes requiring funding. The main target group for this action are potential donors, including both national (governmental, financial and private sector institutions) and bilateral or multilateral donors and international organisations.

## **3.3 Information needs for a Pan-European approach to national action**

Data and information need to be compiled and used in a systematical, coherent manner to ensure the effective design and implementation of the Pan-European Ecological Network, and to periodically review its status.

### **3.3.1 Setting priorities**

First and foremost, information is required with which to assess Pan-European priorities. This requires the compilation of information on components of biodiversity from a wide range of national and international organizations, and the compilation and analysis of that information in a manner that allows the identification of a Pan-European context for national action. The types of information that should be covered are discussed later.

### **3.3.2 Monitoring and reporting**

Subsequent action to maintain and improve the network will be effective only if based on regularly updated information, reflecting the current status of the European biodiversity and the current status of development of the Pan-European Ecological Network. This information can only be obtained through programmes to monitor and regularly report on identified aspects of biodiversity components and site conservation.

## **3.4 Principles in management of information**

In practice the application of information requires identification of sources of relevant data or information, review of information for assessing the status of the network (which needs to be organised as a continuous process supporting the network) and reporting on implementation (which needs to be organised as a process complementary to monitoring). Collection and management of such coherent, spatially related, up-to-date information involves carefully designed information technology solutions and closer cooperation among researchers, conservationists and decision makers of countries involved in developing and implementing the Pan-European Ecological Network.

### **3.4.1 Information management in networks**

Developing working systems for access to and use of the information needed for development and implementation of the Pan-European Ecological Network is far more important than the development of a central database - which may not be needed. Each country needs to assess information needs and plan to meet those needs by building on existing information management practice through improved networking, setting clear roles and responsibilities, and identifying

standards and guidelines for information management and exchange that will allow a distributed network of information sources and databases to function effectively. Information management is much more effective where it is done by those closest to the data.

### **3.4.2 Two-way flow of information**

Information needs to move in two directions. A major problem for “two-way” information flow is often the absence of adequate methodologies and facilities for exchange between different levels of conservation entities, and frequently a mismatch in interests and requirements.

Incorporation of information from the “lower” site level is likely to provide useful input to understanding of the status and distribution of biodiversity components. For example, designation of national protected areas is usually supported by background argumentation, documentation of natural area features including species and ecosystem characteristics, and so on. Although the site may not be of importance at the Pan-European level, there is no doubt that the data will be of value for network development as they can be related to broader spatial or biological subjects (habitats, ecosystems, landscapes or populations and species) in combination with information from other sites.

However, “higher” level entities rarely provide information that is up-to-date enough or at the appropriate scale for supporting action at the local level. The result of this is a general lack of interest in lower level institutions in regular interaction and information exchange with the upper levels or programmes until there is a more direct and immediate benefit to the local level. However, information on the importance of any particular site in a Pan-European or sub-regional context is particularly important when protected areas are under pressure from other activities, or shortage of resources.

The absence of information feedback mechanisms, one of the requisites of managing any big system, is unfortunate, and overcoming this situation might be considered an aspect of successful development the Pan-European Ecological Network, and as an indicator of success of integration of the local, national and international efforts in development of comprehensive network of protected areas.

### **3.4.3 Integrating monitoring and reporting**

Monitoring and reporting are often carried out as separate exercises. Coherence in monitoring and reporting mechanisms will improve the quality of implementation of both tasks, the separation of which often leads to duplication of effort - especially expensive where the higher levels of data integration and information processing are involved. Costs of this separation could be extremely high in programmes of multinational or continental scale like the Pan-European Ecological Network.

## **3.5 Effective use of available information**

The effectiveness of application of environmental and conservation information depends to a major degree on keeping a balance between acceptable levels of uncertainty typical of biodiversity-related data and appropriate data integration techniques incorporating step-by-step ascent from diverse sources to the clear and simple (generalized) scheme (picture, advice, set of indicators) applicable to practical decision making.

### **3.5.1 Adequacy of the information**

The major obstacle in the initial stages of organisation of information support for development of the network is that many relevant existing information and experience is not pooled yet, and still needs to be organised, spatially related, and made available to those involved in establishing the Pan-European Ecological Network.

The Pan-European Ecological Network builds on a wide range of existing international initiatives, involving actors at all levels and in a wide range of sectors, and focuses on natural values of Pan-

European importance. This emphasis on existing initiatives is key to minimizing duplication of efforts in design of a common and coherent framework and in provision of an adequate information support for guiding cooperative and decentralised actions.

Action needs to be taken to identify the gaps or inadequacies in existing knowledge and to remedy these shortcomings. This should be done in an efficient manner, incorporating and integrating to the maximum extent possible existing information prepared in framework of the various national, European and global programmes and initiatives, reducing as much as possible duplication in the field of conservation information compilation.

### **3.5.2 Optimal approach to dealing with inadequate information**

The optimal balance in implementation of the information support for development of the Pan-European Ecological Network might be found between the maximal incorporation of existing data and development of corresponding integration methods and tools, minimal compilation of new data, clearly outlined forms of information output prepared for specific users, ability to initiate information feedback between different levels of user, and ability to incorporate this additional data in order to conduct real monitoring. With this sort of approach, information support could intensify on-the-ground implementation of the Pan-European Ecological Network and facilitate the reporting process.

### **3.5.3 Spatially referenced information**

By definition the Pan-European Ecological Network is concentrated mostly at the spatial measures of conservation, with the development of a comprehensive and connected network of core areas, corridors and buffer areas. The information required for incorporated into the design of the network will therefore necessarily have a spatial character, and needs to be presented in form that allows integration of national and international sources.

## **3.6 Assessment and monitoring**

Key to the development and implementation of a programme that has real benefits to conservation is the ability to assess what has been done and to adjust future action accordingly. There are three areas requiring some form of assessment, implementation of the network, effectiveness of the network, and effectiveness in using available information.

### **3.6.1 Assessing implementation of the network**

The Pan-European Ecological Network is addressed clearly to “on the ground” objectives – some defined area will be protected or biodiversity considerations more thoroughly integrated into its management. This approach provides an opportunity to introduce clear quantitative indicators in the assessment of the success of the implementation of the Pan-European Ecological Network. For example, it will be possible to assess the extent to which old-growth forest areas are protected by the network. In addition, the multiple criteria developed in the context of many ongoing programmes discussed in the *Approaches* paper could provide the basis for developing excellent quality and quantity indicators.

### **3.6.2 Assessing effectiveness of the network**

A common feature of conservation programmes is the absence of clear tools and means of measuring effectiveness, and this will have implications for the extent to which the effectiveness of the Pan-European Ecological Network can be assessed. Mechanisms must be developed for assessing the effectiveness of the conservation activities undertaken at the national level, both to ensure the effective management of biodiversity and landscape, and to ensure the effective use of resources. Any support that can be given to guiding this effort internationally would help to ensure a coordinated approach to such assessment.

### **3.6.3 Assessing effectiveness of application of information**

There are opportunities to identify indirect measures for the level of success of information support for conservation. The most transparent and simple relative parameter used for this purpose is the quantity of information requests covered by some programme, like the now very commonly-used indicator of the number of visitors to a particular Internet site. The only problem is that this type of measure does not necessarily lead to the any action “in field” or at the managerial level.

The frequency of use of the information prepared in framework of Pan-European Ecological Network during the implementation of actions is the only reliable indicator of the value of the information, so information on information use should be collected as part of the reporting process to provide the necessary feedback on information and its use.

## 4 APPLYING THE PAN-EUROPEAN CRITERIA

While *Criteria* for development of the Pan-European Ecological Network have been drafted, these have not been adopted yet because of the potential “conflict” with other existing international obligations (for example the EC Directives on birds and habitats, or the Bern Convention). This section therefore only covers some of the key issues involved in using information to implement Pan-European priorities.

### 4.1 Biodiversity components of Pan-European significance

The paper *Development of an approach to a Pan-European Ecological Network* identifies a number of areas where Pan-European datasets are required in order to be able to identify Pan-European priorities at both national and international levels. These datasets include:

- ◆ Species and ecosystems that are *characteristic* of Europe, i.e. those which only occur within Europe, or for which Europe holds a significant proportion of the world population at any particular point in time.
- ◆ Species and ecosystems that are *endemic* to Europe or a part of Europe, the relative importance of the species or ecosystem being dependent on the size of the region to which it is endemic.
- ◆ Species and ecosystems that are *threatened* with risk of extinction in the wild. Particularly important is the global status of the species, though Pan-European status is also important in assessment of Pan-European objectives.
- ◆ Species with a *special role* in nature conservation for economic, social, cultural or educational reasons.

Meanwhile, several international instruments also identify species and by implication ecosystems of regional importance, including the EC birds and habitats directives and the Bern Convention.

Much of the necessary information is available from variety of sources, but for many species and ecosystems it is either incomplete, or not currently compiled in a form that is immediately useful for identification of Pan-European priorities. The most consistently available information is probably that on threatened species and on national endemics. The following sections discuss the types of information available, and potential problems with the use of available information.

### 4.2 Status and distribution of species

An example of the sort of information already available for species at the global level can be found on the WCMC web site <<http://www.wcmc.org.uk/species/data/index.html>>, which includes links to the *World List of Threatened Trees*, the 1996 *IUCN Red List of Threatened Animals*, *Threatened Plants of the World*, and the draft *Integrated Species Information* database. The last mentioned item covers animals in the IUCN Red List, and/or on the appendices/annexes of existing international legislation, including CITES, the Convention on Migratory Species, the Berne Convention and the EC Regulation No. 338/97 on wildlife trade. The database incorporates data and text from *Birds to Watch 2* published by BirdLife International.

Similar information has been compiled at various times by the European Commission and the Council of Europe, and a range of organizations and societies oriented towards the study of specific taxa or groups of taxa. This information is generally restricted either geographically and/or by taxa, and coverage is not generally not comprehensive.

A second problem with the practical application of these sources is that information on distribution is often inconsistent or inadequate to allow comparison of data on distribution or number of species

available at the national level across the countries involved in building of Pan-European Ecological Network. For example, the species distribution information associated with species listed on the appendices of the various international conventions is inconsistent.

Finally, there is variation in the taxonomies used, for example the taxonomy used in developing the appendices of the various international instruments. This creates a requirement for the careful use of synonyms and their comparative tabulation, building on work already being carried out by the European Environment Agency and its European Topic Centre on Nature Conservation.

#### **4.3 Needs of individual species**

Individual species have different requirements at different times of year, and this has an affect on how ecological networks are implemented. For example, protection of the nesting sites of migratory birds is of limited value if wintering sites are not protected, and if necessary stopover sites are not available along migratory routes. The problem for compilation of information that supports implementation of the network is that it is difficult to develop approaches that are generic. The one obvious exception is the major “flyways” used by migratory bird species.

The *Criteria* paper particularly identifies Pan-European bird migration routes, river corridors and historical corridors of plant-spreading through mountain bridges, along warm river valleys and through mountain ranges.

#### **4.4 Status and distribution of ecosystems**

An example of the sort of information already available for ecosystems at the global level can be found on the WCMC web site <<http://www.wcmc.org.uk/forest/data/cdrom2/index.html>>, which links to *A Global Overview of Forest Conservation*. This assessment includes data on forest distribution and status worldwide, derived from a wide range of national and international sources. The spatial data have formed the basis for a major statistical analysis of forest protection carried out in conjunction with the Centre for International Forestry Research, and are available on CD-ROM.

Reviews of important wetlands in most of the region have been carried out, but these have not all been carried out at the same time or using the same criteria, and have not yet been compiled into a single information source on which a review of Pan-European priorities can be made that is applicable at the national level. These reviews have been variously carried out by Wetlands International, IUCN - The World Conservation Union and national organizations, and are supplemented over parts of the region by research by Wetlands International and BirdLife International on *Important Bird Areas*.

Systematic reviews of other ecosystems over the whole Pan-European region are rare, and more common are reviews of particular habitats within smaller sub-regions such as the Mediterranean or Alpine regions. Such reviews have been carried out at various times by the European Commission, the Council of Europe, the European Union for Coastal Conservation, and a range of other organizations with interests in specific ecosystem types. These provide valuable input to a review of Pan-European priorities, but ought to be viewed within a Pan-European context which is currently not complete. Priority ecosystems to cover are identified in the *Pan-European Biological and Landscape Diversity Strategy* as coastal and marine, rivers, wetlands, grassland, mountain and forest ecosystems.

Within the European Union and certain countries in Central and Eastern Europe, the CORINE classification has been used to identify sites that meet certain European criteria for habitats and/or species. While this is not, strictly speaking, an ecosystem approach, the application of the CORINE classification to the whole Pan-European region might facilitate assessment of the status and distribution of a wide range of habitat types within the region.

Unlike species, there is no internationally accepted classification system for ecosystems, landscapes, or bioregions that has been applied systematically to the whole Pan-European region at a useful scale for conservation action. While this is not essential to conservation action on the ground, such systems could be used to ensure adequate coverage of Pan-European ecosystems, landscape and/or bioregions were they to exist.

**4.5 Application of the criteria**

Application of Pan-European priorities requires the use of the lists of species and ecosystems of Pan-European significance identified above, in combination with information on the status and distribution of these species and ecosystems within the country both within and outside the currently existing protected area network.

In summary this requires the following action at the national level:

- a) Analysis of available information to identify potential locations for core areas, taking account of existing designated areas, and in particular those sites designated as contributions to international agreements and programmes.
- b) Assessment of the “naturalness” of the areas identified, perhaps using the definitions developed in the *Criteria* paper.
- c) Use of available information to assess whether these sites should also be designated nationally or internationally if they have not already been so designated.
- d) Identification of those species and ecosystems of Pan-European significance whose ecological requirements extend beyond the boundaries of the identified core areas.
- e) Identification of areas (corridors, buffer zones) which would provide the additional ecological requirements (particularly for combinations of species and ecosystems), and thereby increase the functionality of the ecological network.
- f) Identification of natural and/or existing corridors and buffer zones (such as bird migration routes or shingle banks protecting a saltmarsh), and the roles they play in protecting species and ecosystems of Pan-European significance.
- g) Identification of areas where rehabilitation or habitat creation may bring about the conditions for conservation of species or ecosystems of Pan-European importance, particularly for those species and ecosystems under greatest threat, or with very narrow ranges.

Recognising the importance of information in implementing the Pan-European Ecological Network, the *Guidelines* address the issue of what action to take where information is inadequate. Part of the action required will therefore be to:

- h) Rapidly assess the information available, and identify key information needs and gaps in that information, so that effort and resources can be carefully targeted, and realistic timetables set for locating or collecting the information.

#### 4.6 International information resources relevant to national implementation of the Pan-European Ecological Network

Information required at the national level for effective implementation of Pan-European objectives includes:

- a) Information on the *status and distribution* of biodiversity elements within the country, particularly those that have been identified as being of Pan-European importance because they are characteristic, endemic, threatened or having a special role. This includes patterns of distribution (such as fragmentation, and ecosystem mosaics).
- b) Information on the degree of disturbance or alteration of particular sites within the country, so that an assessment of *naturalness* is possible, and/or development of methods for assessing naturalness (such as presence of rare or sensitive species).

As it is stated in the *Guidelines*, information will always be imperfect. For example, the conservation status of all biodiversity elements of European importance cannot be known with a high degree of precision, the exact environmental requirements of the important ecosystems, species and habitats are too complex to establish in detail and virtually all human activities can have unintended, unanticipated or unperceived effects on the natural environment. Moreover, even if it was feasible to collect and analyze all of the necessary information, the cost, time and management arrangements involved in doing so would be excessive.

Recommendation 1 in the following section identifies a number of lists and analyses that need to be developed in order to identify Pan-European priorities and thereby support national agencies in meeting these priorities. However a range of other information sources that already exist will help now in preliminary assessment of priorities. These include the following:

- ◆ The CORINE Biotopes classification covers much of the region, and could form the basis for much wider analysis of protected areas coverage at the national level within a Pan-European context. This dataset is available from the UK Institute Terrestrial Ecology, with the permission of the European Environment Agency. The system needs to be extended to cover Russia and the Central Asia region.
- ◆ The EROS Data Center in the United States provides access to datasets on landuse cover for Eurasia, presents a uniform basis for the analysis. At the same time the volume of this data requires very powerful hardware and expensive software which may be out of range of conservation agencies in Central and Eastern Europe.
- ◆ The bioregional dataset closest to the Pan-European Ecological Network needs has been produced under coordination of European Environment Agency and its European Topic Centre on Nature Conservation, and is being extended in collaboration with the Council of Europe.
- ◆ There are two complimentary datasets, providing together the distribution of ecosystems types for the Europe up to the Urals, these are the Potential Vegetation of Europe map produced by the Federal Institute for Nature Conservation, Germany, and the ecoregions map of Central Asia countries produced by the WWF Russian Programme Office.
- ◆ WCMC provides access through the Internet to lists of globally threatened plants and animals, and to datasets and maps on the distribution of forest, as well as a range of information on International Conventions and Programmes and the species and protected areas that they protect.
- ◆ Other more commercial sources provide access to datasets that might be later on be used as standards among basic digital sources, such as the Digital Chart of the World.

Useful background information can also be found following links on the web sites of the European Environment Agency, WCMC, the various other members of the Biodiversity Conservation Information System, the European Centre for Nature Conservation and other sites listed in an Annex 3. However, the backbone datasets necessary for the implementation of the Pan-European Ecological Network still need to be developed and promulgated, as recommended elsewhere in this strategy.

#### 4.7 Recommendations for international action

The following recommendations are suggested for ensuring the efficient and effective implementation of Pan-European priorities for establishment of the Pan-European Ecological Network.

##### **Recommendation for International Action 1**

Draft a review of information on Pan-European species and ecosystems that provides the following information, based as far as possible of existing information sources.

- ☒ Comparative analysis of the annexes, appendices and criteria of existing international agreements
- ☒ List of species and ecosystems threatened at global and/or Pan-European levels
- ☒ List of species and ecosystems endemic to Pan-European region
- ☒ List of species and ecosystems characteristic of the Pan-European region
- ☒ List of species with a "special role" within the Pan-European region
- ☒ Comparative list of species and ecosystems to identify status on other lists
- ☒ Analysis of the above lists by country to identify national responsibilities

Make this information available with appropriate instruction for those who are:

- d) implementing ecological networks at the national level, so that they can incorporate Pan-European priorities into national conservation action; and
- e) making international assessment of the extent to which the Pan-European Ecological network has been implemented.
- f) reviewing the criteria, annexes and appendices of the international agreements

##### **Recommendation for International Action 2**

In order to effectively implement Recommendation 1, develop a collaborative project to compile a list of accepted species and synonyms for the Pan-European region, building on the work currently being carried out by the European Environment Agency and its European Topic Centre on Nature Conservation.

##### **Recommendation for International Action 4**

In order to effectively implement Recommendation 1 and to more effectively implement international agreements at the Pan-European level, prepare a report reviewing distribution information by country for all species:

- ☒ listed on appendices or annexes to international agreements; and/or
- ☒ otherwise identified as being of importance at the Pan-European level.

##### **Recommendation for International Action 5**

Compile information on key comparative studies of ecosystems within the Pan-European region and identify where information sources are to be found, in order to provide the necessary preliminary information on which to base assessment of Pan-European priorities.

**Recommendation for International Action 6**

Develop and implement a programme of Pan-European studies of specific habitat types in order to assess their status and distribution, building on existing work wherever possible. Initial emphasis should be based on the ecosystems identified in the *Pan-European Strategy*.

Make the results of these surveys available to those:

- a) implementing ecological networks at the national level, so that they can incorporate Pan-European priorities into national conservation action; and
- b) making international assessment of the extent to which the Pan-European Ecological network has been implemented.
- c) reviewing the criteria, annexes and appendices of the international agreements.

**Recommendation for International Action 7**

Compile information on the major flyways of the Pan-European region, and on which birds are using them when. Make the results of these surveys available to those:

- a) implementing ecological networks at the national level, so that they can incorporate Pan-European priorities into national conservation action; and
- b) making international assessment of the extent to which the Pan-European Ecological network has been implemented.
- c) reviewing the criteria, annexes and appendices of the international agreements.

**Recommendation for International Action 8**

Consider extending application of the CORINE classification to the whole Pan-European region, and use it to review coverage of different key biotopes.

Consider extension of existing ecosystem, vegetation, landscape and/or bioregional mapping programmes to cover the whole Pan-European region in a consistent manner to facilitate assessment of coverage by the Pan-European Ecological Network.

**4.8 Recommendations for national action**

The following recommendations are suggested for ensuring the efficient and effective implementation of the criteria identified for the Pan-European Ecological Network. These undoubtedly build on work already under way in most European countries.

**Suggestion for National Action 1**

Assess the information available for using Pan-European priorities in implementing the national ecological network, and identify key information needs and gaps in that information, so that effort and resources can be carefully targeted, and realistic timetables set for locating or collecting the information.

**Suggestion for National Action 2**

Compile information on the national status and distribution of those species and ecosystems identified as being of Pan-European significance, and manage it in a manner that facilitates analysis of the extent to which the national ecological networks protect and conserve these species and ecosystems.

**Suggestion for National Action 3**

Develop assessments of national needs and priorities in the context of Pan-European priorities, and provide this information in an appropriate manner to site managers and others involved in the practice of conservation and associated decision making.

**Suggestion for National Action 4**

Ensure that monitoring programmes within protected areas and elsewhere provide sufficient information on the status of those biodiversity components identified as being of Pan-European significance to facilitate site management and reporting.

## 5 IMPLEMENTING THE PAN-EUROPEAN GUIDELINES

A summary of the *Guidelines* is provided in Annex 1. This section covers some of the key issues in using information to implement the *Guidelines*.

### 5.1 Building on existing agreements and initiatives

A major part of the *Guidelines* deals with the processes, through which the network will be developed, a key part of which is building on existing agreements and initiatives. A list of 64 relevant international instruments and other initiatives is provided in Table 3.3 of the *Guidelines*, the most significant at the Pan-European level for core areas in the Pan-European network probably being:

- Ramsar Wetlands Convention
- World Heritage Convention
- UNESCO Man and Biosphere Programme
- Barcelona Convention/Geneva Protocol
- Berne Convention “Emerald” network
- EU Habitats Directive
- EU Birds Directive
- Helsinki Convention
- COE Biogenetic Reserves
- COE European Diploma sites

Major steps in developing the Pan-European Ecological Network at the national level include:

- a) Improvement in the implementation of existing international agreements and initiatives to which the nation is party, and consideration of whether other agreements and initiatives should also be complied with or joined.
- b) Integration of activities currently underway to implement these international agreements and initiatives, in order to benefit from potential synergies and to reduce potential duplication of effort.
- c) Analysis of the information available to assess how these programmes currently contribute to realisation of a Pan-European Ecological Network at the national level, and to identify how they might be integrated into a more holistic approach.

In fact, clarification of the relation between the Pan-European Ecological Network and all other ecological networks at both national and international levels is a key issue identified by the *Guidelines*. Greater clarity will facilitate efforts to share information and experience, and to plan for effective integration of these different programmes.

### 5.2 Integrating ecological considerations into relevant socio-economic sectors

Another major issue in implementation is integrating ecological considerations into relevant socio-economic sectors and reconciling the needs of other land uses with the objectives on the Pan-European Ecological Network. This is likely to be particularly so in corridors and buffer zones.

In order to effectively achieve this it is important to:

- a) Assess the impact of the various sectors and land uses on biodiversity, and in particular on biodiversity components of particular concern, in order to be able to plan for and monitor the necessary integration.
- b) Be particularly aware of threats to biodiversity from all sources, and measures necessary to mitigate the effects of these threats.

- c) Establish programmes to monitor the efficacy of measures taken to ensure that network objectives are reconciled with the needs of other sectors and land uses.

**5.3 Transboundary aspect**

A key thrust of the whole strategy and the Pan-European Ecological Network is strengthening transboundary ecological coherence, and the development of bilateral and multilateral collaboration is a major outcome. Such international collaboration requires the use of available information to identify biodiversity components of Pan-European importance that are shared across particular boundaries or in particular cross-border regions, where international collaboration can have a significant impact.

**5.4 Links to the Convention on Biological Diversity**

Because of the relative importance placed on the Convention on Biological Diversity internationally, and links with the Global Environment Facility as a financial mechanism for its implementation, it is important to draw attention to the importance of the Pan-European Ecological Network in implementing the Convention. Almost without exception, all of the activities proposed in this information assessment are required for implementation of the Convention on Biological Diversity, which the majority of countries in the region have already ratified.

For example:

- ☑ Article 5 requires international cooperation on matters of mutual interest for the conservation and sustainable use of biodiversity
- ☑ Article 6a requires national strategies plans or programmes for conservation and sustainable use of biodiversity
- ☑ Article 6b requires the integration of conservation into other sectors,
- ☑ Article 7a requires identification of components of biodiversity
- ☑ Article 7b requires monitoring of components of biological diversity
- ☑ Article 7c requires identification of threats and potential threats.
- ☑ Article 7d requires maintenance and organization of data
- ☑ Article 8a requires the establishment and management of protected area networks
- ☑ Article 8b is supported directly by the Pan-European approach to setting priorities

Most importantly for a strategic approach to information management, the Convention on Biological Diversity requires effective management of information relating to biodiversity conservation, and its efficient use. Integration of the information needs of the *Pan-European Ecological Network* into the needs and intentions of the Convention on Biological Diversity adds further strength to network development.

Further discussion of the links between the Pan-European Biological and Landscape Diversity Strategy and the Convention on Biological Diversity can be found in a paper prepared by ECNC available on the *Strategy Guide* web site at <[http://www.strategyguide.org/stra\\_cbd.html](http://www.strategyguide.org/stra_cbd.html)>.

As the European Commission begins to implement its Clearing-House Mechanism (CHM), which will cover the PHARE countries as well as the European Union, they will be seeking to link the future development of national CHMs within the region with the existing European reporting mechanisms. At the same time, the CBD Secretariat is developing a CHM “toolkit” to help Parties in initial development of their national CHMs. The two precesses should lead to a more consistent and integrated approach to information management and sharing in the region.

## 5.5 Recommendations for national action

The following recommendations are suggested for ensuring the efficient and effective implementation of the guidelines identified for the Pan-European Ecological Network. These undoubtedly build on work already under way in most European countries.

### **Suggestion for National Action 5**

Review the collection and management of the information required for effective implementation of each individual international programme and agreement in-country (in particular where these contribute to international obligations), with a view to improving implementation and information management procedures, and reporting.

### **Suggestion for National Action 6**

Identify ways to integrate the collection and management of information on how the various international programmes and agreements are currently being implemented in country, in order to streamline implementation, information management and reporting.

### **Suggestion for National Action 7**

Information, information management and reporting relevant to implementation of the Pan-European Ecological Network are directly relevant to implementation of the Convention on Biological Diversity, and information systems should be reviewed and designed with this fact in mind.

### **Suggestion for National Action 8**

Assess the information available to support implementation of international programmes and agreements which the country does not currently participate in.

### **Suggestion for National Action 9**

Identify all major threats to biodiversity elements of Pan-European significance, and the origin of those threats, and establish programmes to monitoring the threats using appropriate indicators, including regular assessment of the extent to which these threats affect ecological networks.

### **Suggestion for National Action 10**

Develop programmes within each sector to regularly review the impact of the sector (both positive and negative) on biodiversity elements of Pan-European significance, and in particular impact on ecological networks.

### **Suggestion for National Action 11**

Use the available information to identify opportunities for transboundary collaboration in the protection of species and ecosystems of Pan-European significance.

## 5.6 Recommendations for international action

The following recommendations are suggested for ensuring the efficient and effective implementation of the guidelines identified for the Pan-European Ecological Network.

### **Recommendation for International Action 9**

Continue the international efforts required to harmonize the information management and reporting requirements of international agreements and programmes, and foster efforts to increase the sharing of information between programmes and secretariats.

**Recommendation for International Action 10**

Develop guidelines applicable at the national level for integrated management of information and integrated reporting on internationally recognised sites.

**Recommendation for International Action 11**

Develop and promulgate indicators that will assist countries in reviewing the impact of threats to biodiversity, and to review the impact both positive and negative of other sectors.

**Recommendation for International Action 12**

Prepare a review of transboundary areas of Pan-European significance based on a review of the appendices, annexes and criteria of International agreements, and other criteria of Pan-European significance.

## 6 KEY CHARACTERISTICS OF INFORMATION

To be useful in implementing and reviewing the network, information must be available, compatible, spatially related, at an appropriate scale of resolution. This has implications for those managing international datasets, as well as for those trying to apply them at the national level. Each of these issues is briefly discussed.

### 6.1 Availability

Information is of no value if not in the hands of those who need to (or should) use it. Effective use of information therefore requires relatively quick and unrestricted access which involves two issues, finance and ability to locate relevant information.

In practice this means that the involvement of any significant expense in acquiring information can have a negative impact on the use of information, whether deliberate or not. Charging for access to information needed for conservation purposes builds financial thresholds which can either prove too high for the less powerful conservation entities, or cause delays in programme implementation as resources are sought.

The most strategic approach to dealing with this problem is to ensure that those national and international datasets of value for implementation and review of the Pan-European Ecological Network are made available to network managers and site managers as cheaply as possible, and preferably at no cost. This will require the identification of key datasets and key dataset holders, and the location of funds internationally for making the data available in appropriate formats.

#### **Consideration in Managing Information**

Information needs to be made available to national network managers and site managers at the lowest possible cost, and preferably free, this will in some cases require the location of funds at national and international levels to make the information available.

A second issue is the ability to locate relevant information. Unless a national network manager is aware of what information exists internationally that will support him in his work, he is unable to use it. The same is true at the national level, if site managers are unaware of which information is available, they are unable to use it. The coordinators of the Pan-European Ecological Network need to develop mechanisms for compiling and making available details of what information is available and where it can be located.

#### **Recommendation for International Action 13**

Develop a compendium of information sources and key contacts to assist national ecological network managers, and guidelines on how this activity can be replicated at the national level.

#### **Recommendation for International Action 14**

Consider development of a metadatabase of information sources on biodiversity elements of Pan-European significance, building on the work of the Council of Europe and the European Environment Agency and its European Topic Centres on Nature Conservation and Catalogue of Data Sources.

### 6.2 Compatibility

For data and information from different sources to be useful in combination it must be compatible. It is important therefore either that similar standards and classification systems are used right across the Pan-European region, or that mechanisms are developed for harmonization of the different standards

and classification systems. This applies equally to methodologies for data description, species or ecosystem classification or typology, lists of objects to be analyzed, parameters developed for different levels of assessment and indicators.

**Consideration in Managing Information**

In developing any list, dataset or indicator and reporting programme, give careful consideration must be given to compatibility of information to facilitate its use, and where necessary guidelines should be provided on either standardization or harmonization.

While technical aspects of computability are important, they are relatively trivial when compared with other aspects and can be resolved at the working level. These are not dealt with here.

**6.3 Spatially-relating “fuzzy” data**

As has been mentioned earlier, a key orientation of the Pan-European Ecological Network is the definition of a physical network of protected sites, so ultimately any information required for use in implementation and review of the Pan-European Ecological Network needs to be linked to concrete locations. The presentation of information on maps facilitates its understanding and interpretation.

While habitats, ecosystems and landscapes have a clear spatial element, and can, at least in theory, be defined spatially, species data needs more careful spatial interpretation particularly in the case of animals. Mapped distribution of individual animal species is difficult to do meaningfully because of variability in density and use of a location with time. This means that often maps are of the habitats and locations used by a species, or where a species has been seen, rather than of the species distribution in the strict sense. This information is useful, but decisions based on such incomplete information may need to be reviewed and adjusted in the future.

**Consideration in Managing Information**

Where decisions on development of the network are made based on incomplete information, they should be reviewed on a regular basis using more recent datasets in an effort to ensure that the correct action is being taken.

Also information is not always certain, which can make mapping difficult. This does not mean, however, that uncertain information should be rejected. There are now well-developed approaches like *Fuzzy Logic* applications, which allow interpretation of uncertain information, although these approaches are still used very little in conservation science.

**Consideration in Managing Information**

Review the use of tools which facilitate interpretation of uncertain information, to assess their application to implementation and review of ecological networks in the Pan-European region.

**6.4 Appropriate scale of resolution**

While each protected areas has very accurately delineated boundaries, the value of this detailed information varies with the purpose to which it is put. At site level maps at 1:25,000 might be the most useful, while at the national level 1:50,000 might be more appropriate, and internationally 1:250,000. Use at the national or international level of maps at 1:25,000 of all protected areas would be burdensome and costly. Similarly, while within a country it might be important to locate a species observation to the most appropriate 1km square, at the international level location to the nearest 10km square might be more than adequate. There is no value in collecting or managing information at more detailed a scale than is required because of the cost of doing so.

However, it is important to ensure that information that is collected at lower scales can be combined in a manner that is useful at more generalised scales. For example, maps at 1:25,000 can be relatively easily generalised for use at 1:250,000, however if information is based on sighting in particular squares or “tetrads”, these must be based on a system that facilitates nesting to higher levels.

**Consideration in Managing Information**

Information should be collected at a scale and level of detail that is most relevant to its use. Where the scale and level of detail required is unknown, this should be assessed through pilot investigation and/or review of experience elsewhere. Ensure that information collected at site level can be readily generalised for use at coarser levels of interpretation, while retaining sufficient meaning.

## 7 KEY CHARACTERISTICS OF INFORMATION PROCESSING

A key feature of the use of information to support design of a Pan-European Ecological Network is the multidimensional nature of biodiversity and multiple interrelation between the different components of living systems at the level of populations, species, ecosystems. The *correlation* between different aspects of these interrelationships is important in identifying key sites for conservation action - which sites are of importance for multiple reasons. Often this correlation of information is achieved deliberately or otherwise through the use of indicator or keystone species approaches, or making assessments by particular habitat types. Using multiple features in assessing priorities, such as protecting sites for a range of species rather than a single species, is likely to be more effective both in practical resource-use terms and in terms of viability.

However, living systems are such that the same decision might be made on one of a range of sets of data. At some final stage, when a decision on concrete action needs to be taken, information is integrated to provide relatively simple guidance on what needs to be done. How many and which steps of data integration have been used to provide the information that supports the decision to establish a new protected area, for example, does not matter. It is more important that the choice of the action was the most appropriate, and can be justified on rational grounds.

Development of the Pan-European Ecological Network starts from a point where ecological networks and national protected area systems already exist, and ongoing national and international initiatives have already covered many important aspects of biodiversity conservation. Development of both national networks and the Pan-European Ecological Network need to be based on the best available information at the time, but this does not and should not preclude improvement over time based on improvement of access to and integration of existing information.

Ongoing integration of data and information will provide new levels of understanding of what and where the priorities for conservation are, and where the concrete actions will be most efficient. Information processes should be organised in such a manner that the uncertainty or gaps in data is the normal and real situation, which might be improved a little by identification of some specific measures, but does not constitute an obstacle to the continual generation of information to support optimization of networks of protected areas.

Major elements of the mechanisms of information integration and processing necessary for supporting development and review of the Pan-European Ecological Network are described below.

### 7.1 Classification

Design of information systems or of information management processes needs to be based from the start on a proper classification of the subjects to be identified and analyzed. This is especially important when the categories are themselves used as the basis for further analysis, and a common mistake is the application of an inappropriate surrogate classification. For example, application of a threatened species list developed for one area in the another one is unlikely to be appropriate - a rare species in Western Europe might be very common and regularly hunted in Russia.

Almost all aspects of biodiversity have been classified in one way or another, and a typical feature of most of these classifications is a hierarchical approach. This is important in facilitating the generalization of information that may be required in taking, for example, a Pan-European overview based on national-level data. Another particular feature of the Pan-European approach will be the need to incorporate spatial elements into classifications of certain biodiversity elements, to clarify the manner in which they use sites within the region. For example, migratory patterns of species of different systematic groups, which will be related to the seasonal habitats of those species.

To facilitate both implementation of the Pan-European Ecological Network and its international review, there are several major areas where development or modification of classification systems could usefully be carried out, and those systems adopted. All the classifications must be applicable in the same degree and uniform for whole region of Pan-European Ecological Network; those of them, with a hierarchical structure could be developed in stages, starting from upper levels.

#### **Recommendation for International Action 15**

Develop and/or modify classification systems that are necessary for effective management, analysis and communication of information at the Pan-European level, and identify an appropriate mechanism for their international adoption. These might cover:

- Protected Areas (IUCN Management Categories)
- Ecological network components (*Approaches* paper)
- Objectives/purpose (Building on IUCN Management Categories)
- Threats (Possibly building on UNEP *Country Study* Guidelines)
- Species (Cross-tabulation of names is important if standard taxonomy is not possible)
- Species movement (no current approach)
- Threatened Species (IUCN Red List Categories)
- Ecosystems (Cross-tabulation of systems is important if standard taxonomy is not possible)
- CORINE Biotopes (needs to be extended to cover Russia, Caucasus, Central Asia)
- Landscapes (Building on Russian Academy of Science classification)
- Bioregions (Building on the Digital Map of European Ecological Regions)

On the other hand, the lack of a classification system of some kind should not be used as an excuse for inaction, and where it is not possible to agree a classification on which to base assessment of protection, or to use in information management, then some form of surrogate or defined typology should be used as long as the data used are clear and can subsequently be classified when and if an appropriate classification is developed. For example, the Ramsar Convention Bureau uses a typology of wetlands in making analysis of wetlands protected by the Convention, rather than a strict classification as it was felt that development of a scientifically acceptable classification would take more time and effort than was appropriate to the need.

## **7.2 Inventories and base maps**

Inventory is the natural stage after appropriate classifications have been accepted, with identification of what biodiversity elements are doing what, where. In particular, it is important for development of a Pan-European approach at the national level to inventory the status and distribution of those species of Pan-European significance.

Ideal is the compilation of this information on maps, and preferably digitally, to facilitate analysis and communication. Wherever possible, the datasets will be produced by compiling and integrating already existing map-based information, and partly, in the case of species, using additional tools to relate the available descriptive data to map-based locations.

An ecosystem map should probably be considered as a major component in the set of tools which needs to be available for analytical, presentation and reporting purposes. This map might combine different hierarchical levels from bioregional, landscape and ecosystem classifications, at levels appropriate to national needs. This source would provide both the maps and statistical basis for setting priorities for actions to address the ecosystem aspect of the Pan-European Ecological Network.

The synthesis of other parameters developed based on the Pan-European criteria proposed in the *Approaches* paper could then be based on the relation of that data to the spatial units delineated on ecosystem maps. At the same time these maps would provide the uniform platform for gathering of data and monitoring of implementation of the Pan-European Ecological Network.

### **Consideration in Managing Information**

The standardization or harmonization of base maps used in each country in the development and management of ecological networks would facilitate international assessment of the degree of implementation of the network. This would, in itself, further support national priority setting. This harmonization process could be initiated through comparison of the approaches currently used country by country to assess the degree of difference that currently exists.

Inventory and mapping at national level also needs to cover the existing protected area systems, so that this information can be used in assessment of the Pan-European significance of existing protected areas, and the extent to which the existing system meets Pan-European needs.

### **7.3 Integration of information**

The comprehensive but naturally complicated set of criteria introduced in developing an approach to a Pan-European Ecological Network needs to be converted to simple quantitative and qualitative parameters that allow decisions to be made on which sites to include in the network. The final form of analytical materials, which should supplement and support the process of network development, should clearly display simple indicators, answering straightforward questions such as:

- a) Which existing protected areas coincide with the objectives of Pan-European Ecological Network and therefore constitute the part of it?
- b) Which parts of ecosystems or landscape units lying outside of existing protected area networks are of Pan-European importance for species and/or ecosystem conservation, and are of high priority for establishing new protected areas?
- c) How does conservation action within these areas need to be augmented with the appropriate use of corridors and buffer zones?
- d) What is the current overall status of protection of biodiversity in the Pan-European region, and what needs to be achieved next?

In other words, the full range of potentially complicated and comprehensive information needs to be incorporated into information management processes, but hidden in outputs to ensure their comprehension. Decision-makers do not need volumes of reports describing each particular piece of the immeasurable biodiversity jigsaw. Final indicators should be clear and simple, and well presented, although the background information must be available on request.

Formalization of a developed set of criteria and design of rules for weighting these criteria could be undertaken in parallel with the classification harmonization discussed above. At the same time, consideration of the thematic and spatial availability of the parameters necessary for the chosen indicators will highlight the most significant gaps in information available and therefore the areas where additional research is needed. These information gaps might be filled either with the data from field investigation or with the results of modeling, indirect analysis data like satellite image analysis or the application of fuzzy logic analysis.

**Recommendation for International Action 16**

Agree a uniform approach to the development and use of indicators of conservation value for assessing protected sites and other landscape units, based on the criteria agreed for identifying Pan-European significance. This will require research on appropriate indicators following final agreement on the criteria to be used in identifying Pan-European significance.

**Recommendation for International Action 17**

Make information and training available in "high tech" approaches to conservation assessment, and share experiences through workshops, for situations where insufficient information available.. This would include analysis using uncertain information, spatial modeling, and use of remote sensing applications.

**7.4 Gap analysis**

With adequate maps of the distribution of species and ecosystems of Pan-European significance (incorporating the indicators covered in the previous section as appropriate), and maps of the existing protected area network, it is possible to then use gap analysis techniques to assess the effectiveness of the protected areas network in covering the species and ecosystems in question. Such techniques will identify which protected areas are of Pan-European significance, and other sites which should be added to the network because of their significance. This sort of analysis can be done by hand, but there are also well tried techniques for the use of computer Geographic Information Systems described in a range of publications. See for example the National Gap Analysis Programme website at the University of Idaho < <http://www.gap.uidaho.edu/gap>>, or the ESRI Virtual Campus (which provides on-line training in GIS <<http://campus.esri.com/campus/home/home.cfm>>).

**Recommendation for International Action 18**

Consider running workshops and/or seminars on the use of computer Geographic Information Systems (GIS) and gap analysis techniques so that experience can be shared within the region.

**7.5 Agreed and adjustable process of assessment and monitoring**

There are three basis reasons for assessment and monitoring on a continuous or periodic basis depending on need. These are:

- a) To support management action at the site level.
- b) To provide ongoing assessment of the conservation of biodiversity at the national level, ensuring that the national ecological network continues to meet Pan-European needs.
- c) To provide ongoing assessment of the status of the Pan-European Ecological Network, and the extent to which it is meeting its objectives.

There are currently no successful examples where monitoring of biodiversity and conservation has been implemented over a comparable area with the aim of simultaneously meeting the needs of national assessment, international assessment, and protected area system planning and management. In fact the region is well suited to this sort of assessment and monitoring, as it is well covered by studies and has a significant body of information and expertise.

**Suggestion for National Action 12**

At the site level, monitoring should be planned and implemented firstly so as to support management action, to ensure that management continues to ensure that the protected area meets the objectives for which it was established. A secondary objective is to compile information required for national and international assessment.

**Suggestion for National Action 13**

At the national level, monitoring and assessment programmes should be organized to provide regular assessment of:

- a) the status of species and ecosystems of Pan-European significance;
- b) the status of the network of sites set up to protect those species and ecosystems; and
- c) the impact of threats to biodiversity and the actions being taken to mitigate those threats.

It is important that monitoring and assessment at the international level is based as far as is possible on information provided by national monitoring and assessment programmes. This is important both from a pragmatic and a political viewpoint. However there needs to be clear guidance on what data and information is required.

**Recommendation for International Action 19**

An international assessment programme should be developed which compiles information from national and other sources in order to assess the effectiveness of the Pan-European Ecological Network in protecting species and ecosystems of Pan-European significance. The programme should be based on periodic submission of information from national assessment programmes, and supporting information from research institutes and international organizations. The programme should aim to achieve two interrelated tasks:

- d) Assessment of progress in achieving the objectives of the Pan-European Ecological Network as a means to report on activity, to set future priorities, and to orient future action.
- e) To provide data and information which will support other activities at the Pan-European level, including education, communication and research.
- f) reviewing the criteria, annexes and appendices of the international agreements.

This approach is strongly recommended for introducing to the countries involved and for the approval by participants involved in creation of the Pan-European Ecological Network. It could considerably reduce the cost of information support, reporting activities and finally improve the effectiveness of the implementation of Pan-European Ecological Network. At the same time it will lay the groundwork for gradual replacement of the common approach of lobbying for individual conservation issues with a more clearly prioritized and the “data shared – idea proved” manner of cooperation.

Development of a permanent two-way flow of information will make it possible to generate assessment statistics and analytical maps on a regular basis, with better spatial and attribute data, integrated and weighted according to rules initially developed to some extent but adjusted to the up-to-date level of implementation of Pan-European Ecological Network.

## 8 RESEARCH NEEDS

While the need for further research must not hold up the process of developing the *Pan-European Ecological Network*, there are many areas where information and knowledge are currently lacking. A number of these areas are immediately obvious from study of the *Criteria* and *Guidelines*. The following is a preliminary assessment of what the key research needs are with respect to information and information management:

- ◆ Development of harmonised classification systems of both species and ecosystems, to provide a uniform basis for the analytical support for Pan-European Ecological Network.
- ◆ Development of a Pan-European digital spatial dataset on bioregional, landscape and ecosystem distribution, for use in integration of information and planning of the network.
- ◆ Ensuring adequate assessment of the ecological requirements of species and ecosystems of Pan-European significance to ensure their effective conservation.
- ◆ Increased understanding of the need for, and roles of, corridors, particularly for those species and ecosystems of Pan-European significance.
- ◆ Understanding of the resilience of different species and ecosystems to different threats and conflicting land use, both temporally and spatially.
- ◆ Harmonisation of criteria and information management between different international conventions and programmes.

### **Recommendation for International Action 20**

Review all the research needs for establishment of the Pan-European Ecological Network implied by the *Criteria* and *Guidelines* papers and this assessment, and draw up a list of research priorities that might be addressed by European universities and research institutes.

## 9 MANAGEMENT OF INFORMATION

There are three aspects of information management critical to the whole process, management of information at the national level, management of information at the international level, and the sharing of experience. These are discussed extensively elsewhere, so are only covered briefly here.

### 9.1 Management of information at the national level

By its very nature, development and management of an effective national contribution to the *Pan-European Ecological Network* will be multi-level and multi-sectoral. It will involve national agencies, local authorities and private enterprise. It will involve protected area agencies, forest departments and water authorities. It will involve the research community, and it will involve the international community. It therefore follows that effective information collection and management at the national level is essential and the main directions will be:

- ◆ Integrated management of information on the status and distribution of biodiversity components, particularly those of Pan-European significance.
- ◆ Integrated management of information on the national designated area networks, as a key part of the effective management of those systems at national level, taking into consideration the Pan-European significance of the areas.
- ◆ Integrated management of information on implementation of the wide range of international programmes and agreements, in order to ensure that these activities can be applied in an integrated and synergistic manner and have direct influence on conservation action “on the ground”.
- ◆ Integrated management of information on the threats and potential threats to species and ecosystems and to the systems of designated areas established for their protection.
- ◆ Use of the information for a wide range of purposes including reporting, decision making, priority setting and strategic planning, education, research and communication programmes.

It is important to establish information systems that coordinate and build on existing activities rather than replace and duplicate them. With this in mind emphasis should be placed on management of information in distributed but networked databases, with clearly identified responsibilities and “custodianship”, and ease of access for users.

#### **Recommendation for International Action 21**

Review national information systems in order to ensure that they are fulfilling national and international information needs in a cost-effective and synergistic manner.

#### **Recommendation for International Action 22**

Develop a programme of expertise exchange through conferences, workshops, staff exchange and training programmes, concentrating on the practical applications of information management tools and modern techniques.

### 9.2 Management of information at the international level

A system needs to be developed for managing information on the Pan-European Ecological Network at the international level, taking information from the periodic national reports, combining it, and

integrating it with information from other sources. It is important that those submitting national reports can see how they are used, and see the information that they submit in a Pan-European context. This means that the information management system or its products must be readily available. Characteristics of such a system are that it:

- ◆ incorporates and integrates information from national reports;
- ◆ incorporates and integrates biodiversity information from other accepted sources, and also information from international treaty and programme secretariats;
- ◆ supports Pan-European reporting and priority setting, helping to set the strategy and agenda for future conservation action in the region; and
- ◆ supports education, research and communication programmes that themselves further promote development and functioning of the Pan-European Ecological Network.

#### **Recommendation for International Action 23**

Develop an international system for compiling and managing information on the sites which comprise the Pan-European Ecological Network, coupled with information on species and ecosystems of Pan-European significance and links with other “site-based” international conventions and programmes.

Use this information system in supporting both reporting on the status of the network, and the ongoing establishment and review of needs and priorities, making it available in such a manner that it can be used by national system managers in reviewing Pan-European priorities (incorporating information from the lists compiled in response to Recommendation 1 and identifying the extent to which these priorities are already being addressed).

The web-based “*Strategy Guide*” <<http://www.strategyguide.org/>> already provides information on the strategy. This information source provides access to copies of all relevant documents, to information on actions being taken to implement the strategy, and to information on a range of related programmes. A range of pages on this website cover various aspects of action theme one <[http://www.strategyguide.org/at1/at1\\_inde.html](http://www.strategyguide.org/at1/at1_inde.html)> and its implementation at national and international levels.

#### **Recommendation for International Action 24**

Develop the action theme one pages of the strategy guide further to give a stronger identity to the Pan-European Ecological Network, and integrate more thoroughly information on national action compiled through national reporting programmes.

Provide clear links to both the information system referred to in Recommendation 43 (which reviews the extent of the network and the extent to which it is meeting Pan-European needs), and to the *LYNX* facilities referred to in Recommendation 45 (which provides access to the experience of others in development and implementation of ecological networks).

### **9.3 Sharing experience**

In addition to the regular exchange of information on both biodiversity in the Pan-European region and the action being taken to conserve it, it is also important to set up mechanisms for the sharing of experience in establishing ecological networks so that lessons can be learnt from both the good and the bad experiences of others. In 1996, the European Centre for Nature Conservation established “*LYNX*” as a special interest network on ecological networks. *LYNX* is a partnership effort between a range of organizations <<http://www.ecnc.nl/lynx/lynxhome.html>>. This existing programme needs to be built up in order to meet the increasing needs for support that are required at national and local levels, and to learn from the experience of provided the information service to date.

**Recommendation for International Action 25**

Strengthen *LYNX* and promote it as the primary mechanism for sharing experience relevant to the development and implementation of the Pan-European Ecological Network. Strengthen the existing information services with:

- ☒ review of currently available information and the use made of it;
- ☒ review of user-needs followed by action to meet those needs;
- ☒ review of *LYNX* partnership to assess whether adjustment is necessary;
- ☒ develop improved mechanisms for compiling and sharing case studies/best practice;
- ☒ develop a more proactive approach to the addition of information; and
- ☒ use workshops and training programmes to promote the sharing of information.

## 10 REPORTING MECHANISMS AND SCHEDULES

The *Guidelines* document recommends the following procedures for regularly informing the various bodies involved in implementation of the *Pan-European Biological and Landscape Diversity Strategy* and its various action themes. This information is required primarily for effective co-ordination of the development of the network, and for priority setting.

- ◆ Each Country participating in the programme should prepare a national report each year from 2001, identifying actions taken to implement the network and the results achieved.
- ◆ This report should be submitted to the Committee of Experts for the Pan-European Ecological Network not later than three months before their annual meeting.
- ◆ The format of these reports and the information to be included will be determined by the Committee of Experts following adoption of the *Criteria and Guidelines* by the Committee.
- ◆ In developing the format for national reports, the Committee of Experts will take account of other international reporting requirements and expectations.
- ◆ The Committee of Experts will report to the Executive Bureau on the basis of these reports, with recommendations for future action.
- ◆ The information the reports will also be used as the basis for reports to the European Environment Ministers Conference).

### **Recommendation for International Action 26**

Develop a reporting format and process for the Pan-European Ecological Network which will:

- c) Ensure that Pan-European targets are being met, and future priorities based on progress to date.
- d) Provide national agencies with comparative information to support their future efforts in management and implementation.
- c) Support research programmes, particularly those oriented towards further implementation of the Pan-European Strategy.
- d) Compile information to support communications programmes and fund raising at the international level.

In developing the reporting format and process, the agencies concerned should ensure that:

- d) Information is only requested if it is actually required for a real identifiable purpose, which is understood by those doing the reporting.
- e) Information is not requested if it is already available elsewhere.
- f) The information requested is part of what the country would (or should) need to have access to anyway in developing and managing its designated area networks.

Listed in Annex 4 are ten guiding principles in preparing and requesting national reports, taken from a paper on guidelines for national reporting drafted for the Secretariat of the Convention on Biological Diversity by the World Conservation Monitoring Centre. Central to the application of these principles is the need to reduce the reporting burden placed on nations.

It is also essential to ensure that information made available in national reports is made more widely available at least to other treaty and programme secretariats to increase the use to which the information is put.

**Recommendation for International Action 27**

Information derived from national reports should be shared with other international bodies, preferably working through an agreed focal point, to ensure synergy in information management, and to reduce the potential for duplication of effort.

# ANNEX 1 - SUMMARY OF GUIDELINES

## *From Guidelines for the development of the Pan-European Ecological Network*

### **GUIDELINES ON THE OBJECTIVES AND CHARACTERISTICS OF THE PAN-EUROPEAN ECOLOGICAL NETWORK - Summary**

The objectives of the Pan-European Ecological Network are to ensure:

- the conservation of the characteristic ecosystems, natural habitats and landscapes of European importance across their traditional ranges
- the sustainable use of semi-natural habitats of European importance
- the maintenance of viable populations of species of European importance across their traditional ranges
- the maintenance of the environmental processes on which these ecosystems, habitats, species and landscapes depend.

The following general principles should be applied in determining the location and configuration of the areas making up the Pan-European Ecological Network:

- the conserved areas of each particular habitat type and landscape should extend as far as possible over the traditional range of the habitat
- the areas conserved should ideally be as large as possible, as many as possible, contain viable populations of at least the most vulnerable species and accommodate the essential environmental processes on which biodiversity depends
- patches of a particular habitat type should be as close together as possible and the landscape between the patches should facilitate dispersal as appropriate
- any activities within the network should be compatible with the respective conservation objectives
- the network should be buffered from the potentially damaging effects of external activities.

The core areas of the Pan-European Ecological Network should contain as far as possible:

- substantial representatives from the characteristic European natural and semi-natural habitat types across their traditional range and at different stages of ecological succession
- viable populations of species of European importance
- the natural environmental processes on which these habitats and species populations depend
- landscapes of European importance.

The incorporation of corridors into the Pan-European Ecological Network will:

- at the European level, provide migration routes for species of European importance, allow species to recolonise regions that they no longer inhabit and provide species with the opportunity to respond to major environmental change
- at the regional level, allow species to recolonise specific areas, conserve regional migration routes, facilitate genetic exchange and provide access to areas suitable for temporary survival
- be based on the precautionary principle, "no-regret" measures and the best available evidence
- require that research results and practical experience is made available to the relevant actors
- require further research be prioritised to improve short-term effectiveness in applying the corridor concept, identify the species of European importance that would benefit from corridors and develop criteria for locating and designing corridors for these species.

In order to incorporate buffer zones into the Pan-European Ecological Network, it will be desirable to:

- identify for each component of the network the need for buffering with respect to the requirements of the most sensitive species, the most intensive impacts and the particular landscapes
- prevent the initiation or further expansion of inappropriate activities in existing buffer zones
- configure buffer zones to increase the biodiversity value of core areas and to improve interconnectivity
- ensure that appropriate instruments are available and applied to create and manage buffer zones
- give priority to buffer zone policy in integrating biodiversity conservation objectives into other sectors.

Each implementing authority should aim to improve the conservation value of the Pan-European Ecological Network over time by:

- assessing the need to improve the prevailing conditions in its part of the network
- adopting appropriate environmental targets for areas where conditions need to be improved
- specifying the actions that will be necessary to achieve the targets
- identifying the biodiversity values of European importance that have become degraded
- specifying the actions that will be necessary to restore these values.

The authorities should maintain the conservation status of the Pan-European Ecological Network by:

- identifying the management needs for each area and the appropriate management methods
- drawing up and implementing management plans.

## ANNEX 2 - SUMMARY OF KEY INTERNATIONAL INITIATIVES

*From Nature Conservation Sites Designated In Application Of International Instruments And Their Importance For The Pan-European Ecological Network*

| Instrument                                      | Legal basis                                                                           | Character                                                                | Sites in danger                                                                   | Geographical scope                    | Biophysical focus                                                                                      |
|-------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------|
| <b>Ramsar Wetlands Convention</b>               | Legally binding to signatories                                                        | Qualitative and quantitative (number or percentage of waterfowl present) | Inclusion in the Montreux Record; monitoring process; de-listing                  | Global                                | Wetland biomes, incorporating riparian and coastal zones, islands and marine water bodies              |
| <b>World Heritage Convention</b>                | Legally binding to signatories                                                        | Qualitative                                                              | Inclusion in the list of World Heritage in Danger; monitoring process; de-listing | Global                                | None                                                                                                   |
| <b>Man and Biosphere Programme</b>              | Policy programme                                                                      | Qualitative, zonation and organizational criteria                        | Monitoring process; de-listing                                                    | Global                                | None                                                                                                   |
| <b>Biogenetic Reserves</b>                      | Resolution                                                                            | Qualitative                                                              | Monitoring process; de-listing                                                    | Council of Europe and European States | Habitats of wild flora and fauna listed in appendices                                                  |
| <b>European Diploma sites</b>                   | Award, recognition of proper protection                                               | Qualitative                                                              | Letter of warning; withdrawal of award                                            | Council of Europe and European sites  | None                                                                                                   |
| <b>EU Birds Directive</b>                       | Legally binding to EU Member States                                                   | No specific criteria for establishing SPAs, only recommended measures    |                                                                                   | European Union territory              | Focusing on protection of naturally occurring wild birds, as listed in the annexes, and their habitats |
| <b>EU Habitats Directive</b>                    | Legally binding to EU Member States                                                   | Two stage approach, mix of qualitative and quantitative criteria         |                                                                                   | European Union territory              | Natural habitat types and species listed in annexes                                                    |
| <b>Helsinki Convention</b>                      | Legally binding to all countries bordering the Baltic Sea and by the EU Member States | Step-by-step approach, qualitative and organizational criteria           | In process of definition                                                          | Baltic Sea Region                     | Coastal and marine environment of the Baltic Sea                                                       |
| <b>Barcelona Convention and Geneva Protocol</b> | Legally binding to its signatories                                                    | Qualitative                                                              | In process of definition                                                          | Mediterranean Sea Region              | Mediterranean Sea                                                                                      |

## ANNEX 3 - EXAMPLES OF RELEVANT WEBSITES

The following are examples of web sites related to biodiversity information, policy and law that may provide information and support to those developing national ecological networks. The lists are intended to be indicative, and not comprehensive.

| International Conventions              |                                                                                     |
|----------------------------------------|-------------------------------------------------------------------------------------|
| CITES                                  | <a href="http://www.wcmc.org.uk/cites/">http://www.wcmc.org.uk/cites/</a>           |
| Convention on Biological Diversity     | <a href="http://www.biodiv.org/">http://www.biodiv.org/</a>                         |
| Convention on Desertification          | <a href="http://www.unccd.ch/">http://www.unccd.ch/</a>                             |
| Convention on Migratory Species        | <a href="http://www.wcmc.org.uk/cms/">http://www.wcmc.org.uk/cms/</a>               |
| Framework Convention on Climate Change | <a href="http://www.unfccc.org">http://www.unfccc.org</a>                           |
| Ramsar (Wetlands) Convention           | <a href="http://www.iucn.org/themes/ramsar/">http://www.iucn.org/themes/ramsar/</a> |
| World Heritage Convention              | <a href="http://www.unesco.org/whc/">http://www.unesco.org/whc/</a>                 |

| International organisations and programmes              |                                                                       |
|---------------------------------------------------------|-----------------------------------------------------------------------|
| Commission for Sustainable Development                  | <a href="http://www.un.org/DPCSD/">http://www.un.org/DPCSD/</a>       |
| Global Environmental Facility                           | <a href="http://www.gefweb.org">http://www.gefweb.org</a>             |
| IUCN                                                    | <a href="http://www.iucn.org">http://www.iucn.org</a>                 |
| UNDP                                                    | <a href="http://www.undp.org">http://www.undp.org</a>                 |
| UNEP                                                    | <a href="http://www.unep.org">http://www.unep.org</a>                 |
| UNESCO MAB Biosphere Reserves                           | <a href="http://www.unesco.org/mab/">http://www.unesco.org/mab/</a>   |
| Wetlands International                                  | <a href="http://www.wetlands.agro.nl">http://www.wetlands.agro.nl</a> |
| World Bank                                              | <a href="http://www.worldbank.org">http://www.worldbank.org</a>       |
| World Commission on Forests and Sustainable Development | <a href="http://iisd1.iisd.ca/wcfsd/">http://iisd1.iisd.ca/wcfsd/</a> |
| World Conservation Monitoring Centre                    | <a href="http://www.wcmc.org.uk">http://www.wcmc.org.uk</a>           |
| World Resources Institute                               | <a href="http://www.wri.org">http://www.wri.org</a>                   |

| European regional organisations and programmes |                                                                                                               |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| BALLERINA                                      | <a href="http://www.baltic-region.net/index.htm">http://www.baltic-region.net/index.htm</a>                   |
| Council of Europe                              | <a href="http://www.coe.fr/eng/act-e/eenviro.htm">http://www.coe.fr/eng/act-e/eenviro.htm</a>                 |
| European Centre for Nature Conservation        | <a href="http://www.ecnc.nl">http://www.ecnc.nl</a>                                                           |
| European Commission DGIA                       | <a href="http://europa.eu.int/comm/dg1a/index.htm">http://europa.eu.int/comm/dg1a/index.htm</a>               |
| European Commission DGXI                       | <a href="http://europa.eu.int/en/comm/dg11/dg11home.html">http://europa.eu.int/en/comm/dg11/dg11home.html</a> |
| European Environment Agency and EIONET         | <a href="http://www.eea.dk">http://www.eea.dk</a>                                                             |
| European Union for Coastal Conservation        | <a href="http://www.eucc.nl">http://www.eucc.nl</a>                                                           |
| Regional Environmental Centre                  | <a href="http://www.rec.org/">http://www.rec.org/</a>                                                         |
| UNEP GRID Arendal                              | <a href="http://www.grida.no/">http://www.grida.no/</a>                                                       |

| Other useful information sources                          |                                                                                                                           |
|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Environmental Treaties and Resource Indicators (ENTRI)    | <a href="http://sedac.ciesin.org/pidb/pidb-home.html">http://sedac.ciesin.org/pidb/pidb-home.html</a>                     |
| WWW Virtual Library: Forestry                             | <a href="http://www.metla.fi/info/vlib/Forestry/">http://www.metla.fi/info/vlib/Forestry/</a>                             |
| WWW Virtual Library: Environment                          | <a href="http://earthsystems.org/Environment.shtml">http://earthsystems.org/Environment.shtml</a>                         |
| International Organization for Plants Information (IOPI)  | <a href="http://www.iopi.csu.edu.au/iopi/">http://www.iopi.csu.edu.au/iopi/</a>                                           |
| Internet Directory for Botany                             | <a href="http://www.helsinki.fi/kmus/botmenu.html">http://www.helsinki.fi/kmus/botmenu.html</a>                           |
| IUCN Red List of Threatened Animals                       | <a href="http://www.wcmc.org.uk/species/animals_redlist.html">http://www.wcmc.org.uk/species/animals_redlist.html</a>     |
| Linkages and Earth Negotiations Bulletin                  | <a href="http://www.iisd.ca/linkages">http://www.iisd.ca/linkages</a>                                                     |
| LYNX - Special Interest Network on Ecological Networks    | <a href="http://www.ecnc.nl/lynx/lynxhome.html">http://www.ecnc.nl/lynx/lynxhome.html</a>                                 |
| Pan-European Strategy Guide                               | <a href="http://www.strategyguide.org/">http://www.strategyguide.org/</a>                                                 |
| Protected Areas Virtual Library                           | <a href="http://www.wcmc.org.uk/protected_areas/data/pavl.html">http://www.wcmc.org.uk/protected_areas/data/pavl.html</a> |
| United Nations List of National Parks and Protected Areas | <a href="http://www.wcmc.org.uk/protected_areas/data/">http://www.wcmc.org.uk/protected_areas/data/</a>                   |

## ANNEX 4 - GUIDING PRINCIPLES IN REQUESTING AND PRODUCING NATIONAL REPORTS

From *Further guidelines for the preparation of national reports* (UNEP/CBD/SBSTTA/3/Inf. 16)

| Guiding principles in drafting national reports |                                                                                                                                                                               |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| a)                                              | Base the report on information that is required already by the national focal point to ensure that the country is meeting the commitments made in acceding to the Convention. |
| b)                                              | Ensure that the report covers the priority areas identified by the COP in its decisions, and as interpreted by SBSTTA and the Secretariat.                                    |
| c)                                              | Cover what is relevant to implementation of the Convention, not just what is being done because the Convention has been acceded to.                                           |
| d)                                              | Emphasize progress in development and implementation of the National Biodiversity Strategy and/or National Biodiversity Action Plan.                                          |
| e)                                              | Summarize the current status and trends in biodiversity, biodiversity "services", use and threats, and progress in development of programmes to evaluate and monitor these.   |
| f)                                              | Avoid repeating information from national biodiversity strategies and action plans, or national country studies and state of environment reports (they can be appended).      |
| g)                                              | Concentrate on measurable progress since the last report, and identify the progress that is expected before the next report is due.                                           |
| h)                                              | Use indicators to show progress in achieving targets set in the National Biodiversity Strategy and/or National Biodiversity Action Plan, and in previous reports.             |
| i)                                              | Emphasize information that will help other Contracting Parties in their implementation of the Convention, in particular both good practice and bad experience.                |
| j)                                              | Design reports that are useful for multiple purposes with minimal modification, for example as material for journalists, or education.                                        |

